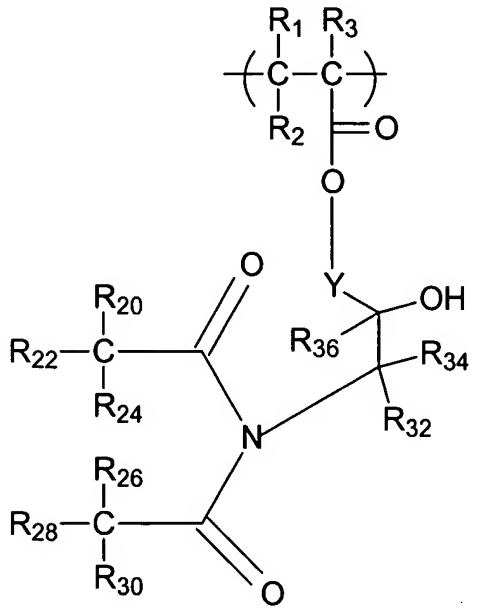
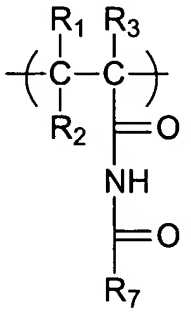
CLAIMS:

1. A polymer comprising at least one repeating unit represented by formula (I) or (II)



(I)



(II)

where R_1, R_2, and R_3 are each independently selected from hydrogen or alkyl; R_7 is alkyl or aryl; R_{20}, R_{22}, R_{24}, R_{26}, R_{28}, and R_{30} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur, or R_{24} and R_{26} taken together (i) form a direct bond, (ii) form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$ where n2 is 0 or 1 and n1+n2+n3 = 1 to 5, or (iii) with the carbon atoms to which they are attached form a carbocyclic ring and R_{20}, R_{22}, R_{28} and R_{30} are as

defined above; R_{32}, R_{34}, and R_{36} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur; and Y is selected from linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical groups, the alkyl, aryl, aralkyl, heterocyclic ring, carbocyclic ring, linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical being unsubstituted or substituted.

2. The polymer of claim 1 which further comprises an additional monomer.

3. The polymer of claim 2 wherein the additional monomer is selected from optionally substituted acrylic esters, optionally substituted acrylic acids, optionally substituted methacrylic esters, optionally substituted methacrylic acids, optionally substituted acrylamides, optionally substituted methacrylamides, optionally substituted allyl compounds, optionally substituted styrenes, optionally substituted hydroxystyrene, optionally substituted hydroxyisopropylstyrene, optionally substituted methylstyrene, optionally substituted hydroxymethylstyrene, optionally substituted hydroxyl-α-methylstyrene, optionally substituted vinyl ethers, optionally substituted vinyl esters, optionally substituted crotonic acids, optionally substituted crotonic acid esters, optionally substituted maleic anhydride, optionally substituted dialkyl itaconates, optionally substituted monoalkyl or dialkyl esters of maleic acid or fumaric acid, and mixtures thereof.

4. The polymer of claim 3 wherein the additional monomer is selected from optionally substituted methacrylic esters and optionally substituted styrenes.

5. The polymer of claim 4 wherein the methacrylic esters contains a pendent hydroxyl group.

6. The polymer of claim 1 wherein the repeating unit is represented by formula (I).

7. The polymer of claim 6 wherein Y is linear or branched alkylene.

8. The polymer of claim 6 wherein each of R_{32}, R_{34}, and R_{36} are independently hydrogen.

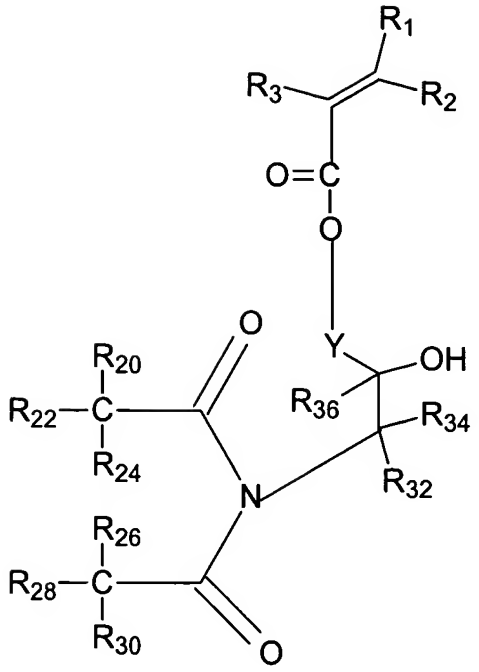
9. The polymer of claim 6 wherein R_{24} and R_{26} taken together form a direct bond.

10. The polymer of claim 6 wherein R_{24} and R_{26} taken together form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$.

11. The polymer of claim 6 wherein R_{24} and R_{26} taken together with the carbon atoms to which they are attached form a carbocyclic ring.

12. The polymer of claim 1 wherein the repeating unit is represented by formula (II).

13. A compound having the formula



(V)

where R_1, R_2, and R_3 are each independently selected from hydrogen or alkyl; R_{20}, R_{22}, R_{24}, R_{26}, R_{28}, and R_{30} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur, or R_{24} and R_{26} taken together (i) form a direct bond, (ii) form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$ where n2 is 0 or 1 and n1+n2+n3 = 1 to 5, or (iii) with the carbon atoms to which they are attached form a carbocyclic ring and R_{20}, R_{22}, R_{28} and R_{30} are as defined above; R_{32}, R_{34}, and R_{36} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur; and Y is selected from linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical groups, the alkyl, aryl, aralkyl, heterocyclic ring, carbocyclic ring, linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical being unsubstituted or substituted.

14. The compound of claim 13 wherein Y is linear or branched alkylene.

15. The compound of claim 13 wherein each of R_{32}, R_{34}, and R_{36} are independently hydrogen.

16. The compound of claim 13 wherein R_{24} and R_{26} taken together form a direct bond.

17. The compound of claim 13 wherein R_{24} and R_{26} taken together form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$.

18. The compound of claim 13 wherein R_{24} and R_{26} taken together with the carbon atoms to which they are attached form a carbocyclic ring.

19. An antireflective coating composition comprising:

a) the polymer according to claim 1; and

b) at least one crosslinking agent.

20. The composition of claim 19 wherein for a), the polymer further comprises an additional monomer.

21. The composition of claim 20 wherein the additional monomer is selected from optionally substituted acrylic esters, optionally substituted acrylic acids, optionally substituted methacrylic esters, optionally substituted methacrylic acids, optionally substituted acrylamides, optionally substituted methacrylamides, optionally substituted allyl compounds, optionally substituted styrenes, optionally substituted hydroxystyrene, optionally substituted hydroxyisopropylstyrene, optionally substituted methylstyrene, optionally substituted hydroxymethylstyrene, optionally substituted hydroxyl-α-methylstyrene, optionally substituted vinyl ethers, optionally substituted vinyl esters, optionally substituted

crotonic acids, optionally substituted crotonic acid esters, optionally substituted maleic anhydride, optionally substituted dialkyl itaconates, optionally substituted monoalkyl or dialkyl esters of maleic acid or fumaric acid, and mixtures thereof.

22. The composition of claim 20 wherein the additional monomer is selected from optionally substituted methacrylates and optionally substituted styrenes.

23. The composition of claim 22 wherein the methacrylic esters contains a pendent hydroxyl group.

24. The composition of claim 19 wherein for a), the polymer comprises a repeating unit represented by formula (I).

25. The composition of claim 24 wherein Y is linear or branched alkylene.

26. The composition of claim 24 wherein each of R_{32}, R_{34}, and R_{36} are independently hydrogen.

27. The composition of claim 24 wherein R_{24} and R_{26} taken together form a direct bond.

28. The composition of claim 24 wherein R_{24} and R_{26} taken together form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$.

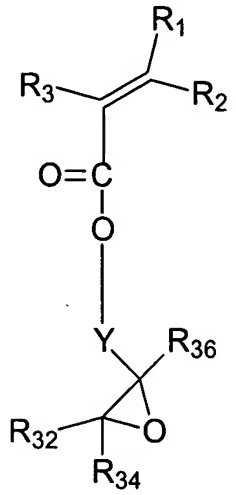
29. The composition of claim 24 wherein R_{24} and R_{26} taken together with the carbon atoms to which they are attached form a carbocyclic ring.

30. The composition of claim 19 wherein for a), the polymer comprises a repeating unit represented by formula (II).

31. The composition of claim 19 wherein b) the crosslinking agent is selected from aminoplasts, isocyanates and mixtures thereof.

32. The composition of claim 19 which further comprises at least one additional component selected from solvents, cross-linking catalysts, monomeric dyes, surface leveling agents, adhesion promoters, and antifoaming agents.

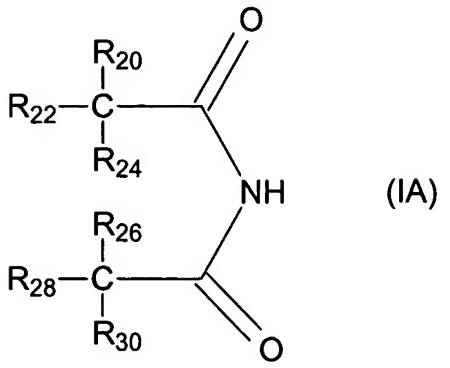
33. A method of making the compound of claim 13 comprising reacting a compound of formula (IB)



(IB)

where R_1, R_2, and R_3 are each independently selected from hydrogen or alkyl; R_{32}, R_{34}, and R_{36} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur; and Y is selected from linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical groups, the alkyl, aryl, aralkyl, heterocyclic ring, carbocyclic ring, linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical being unsubstituted or substituted,

with a compound of formula (IA)



(IA)

where R_{20}, R_{22}, R_{24}, R_{26}, R_{28}, and R_{30} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur, or R_{24} and R_{26} taken together (i) form a direct bond, (ii) form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$ where n2 is 0 or 1 and n1+n2+n3 = 1 to 5, or (iii) with the carbon atoms to which they are attached form a carbocyclic ring and R_{20}, R_{22}, R_{28} and R_{30} are as defined above, the alkyl, aryl, aralkyl, heterocyclic ring, and carbocyclic ring being unsubstituted or substituted,

in the presence of a catalyst and separating the compound of claim 13 from the reaction mixture.

34. The method of claim 33 wherein Y is linear or branched alkylene.

35. The method of claim 33 wherein each of R_{32}, R_{34}, and R_{36} are independently hydrogen.

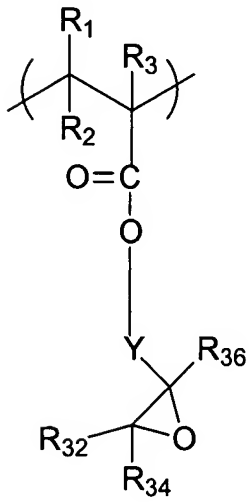
36. The method of claim 33 wherein R_{24} and R_{26} taken together form a direct bond.

37. The method of claim 33 wherein R_{24} and R_{26} taken together form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$.

38. The method of claim 33 wherein R_{24} and R_{26} taken together with the carbon atoms to which they are attached form a carbocyclic ring.

39. A method of making the polymer of claim 1 having a repeating unit of formula (I) which comprises reacting a vinyl polymer or copolymer containing from about 40 to about 100 mol % of an epoxy substituent and an imide in the presence of a catalyst and separating the polymer of claim 1 having the repeating unit of formula (I) from the reaction mixture.

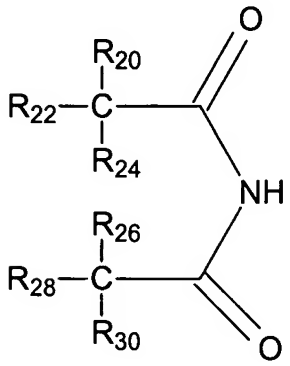
40. The method of claim 39 wherein the vinyl polymer or copolymer comprises at least one repeating unit having the formula



where R_1, R_2, and R_3 are each independently selected from hydrogen or alkyl; and Y is selected from linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical groups, the alkyl, linear or branched alkylene, monocyclic or polycyclic alkylene, arylene, aralkylene, polyoxyalkylene, linear or

branched alkenylene, monocyclic or polycyclic alkenylene, aromatic or non-aromatic heterocyclic diradical and alicyclic diradical being unsubstituted or substituted.

41. The method of claim 39 wherein the imide is



(IA)

where R_{20}, R_{22}, R_{24}, R_{26}, R_{28}, and R_{30} are independently selected from hydrogen, alkyl, aryl, aralkyl, or 5-, 6-, or 7-membered heterocyclic ring containing at least one heteroatom selected from nitrogen, oxygen or sulfur, or R_{24} and R_{26} taken together (i) form a direct bond, (ii) form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$ where n2 is 0 or 1 and n1+n2+n3 = 1 to 5, or (iii) with the carbon atoms to which they are attached form a carbocyclic ring and R_{20}, R_{22}, R_{28} and R_{30} are as defined above, the alkyl, aryl, aralkyl, heterocyclic ring and carbocyclic ring being unsubstituted or substituted.

42. The method of claim 40 wherein Y is linear or branched alkylene.

43. The method of claim 40 wherein each of R_{32}, R_{34}, and R_{36} are independently hydrogen.

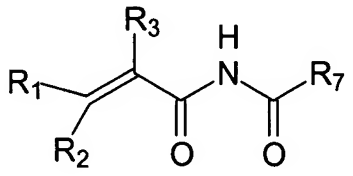
44. The method of claim 41 wherein R_{24} and R_{26} taken together form a direct bond.

45. The method of claim 41 wherein R_{24} and R_{26} taken together form $-(CH_2)_{n1}(O)_{n2}(CH_2)_{n3}-$.

46. The method of claim 41 wherein R_{24} and R_{26} together with the carbon atoms to which they are attached form a carbocyclic ring.

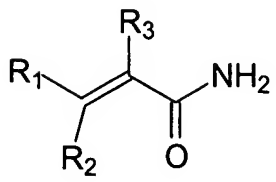
47. The method of claim 39 wherein the polymer comprises an additional monomer selected from optionally substituted acrylic esters, optionally substituted acrylic acids, optionally substituted methacrylic esters, optionally substituted methacrylic acids, optionally substituted acrylamides, optionally substituted methacrylamides, optionally substituted allyl compounds, optionally substituted styrenes, optionally substituted hydroxystyrene, optionally substituted hydroxyisopropylstyrene, optionally substituted methylstyrene, optionally substituted hydroxymethylstyrene, optionally substituted hydroxyl-α-methylstyrene, optionally substituted vinyl ethers, optionally substituted vinyl esters, optionally substituted crotonic acids, optionally substituted crotonic acid esters, optionally substituted maleic anhydride, optionally substituted dialkyl itaconates, optionally substituted monoalkyl or dialkyl esters of maleic acid or fumaric acid, and mixtures thereof.

48. A method of making a compound having formula (III) comprising

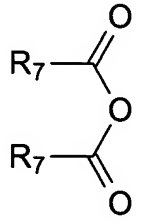


(III)

reacting a compound having formula (IIIa) with a compound having formula (IIIb)



(IIIa)



(IIIb)

where R_1, R_2, and R_3 are each independently selected from hydrogen or alkyl; and R_7 is alkyl or aryl,
in the presence of a catalyst and separating the compound of formula (III) from the reaction mixture.

49. A process for forming an image on a substrate comprising,

a) coating the substrate with the composition of claim 19;
b) heating the coating of step a);
c) forming a coating from a photoresist solution on the coating of step b);
d) heating the photoresist coating to substantially remove solvent from the coating;
e) image-wise exposing the photoresist coating;
f) developing an image using an aqueous alkaline developer;
g) optionally, heating the substrate prior to and after development; and
h) dry etching the composition of step b).

50. The process of claim 49, where the photoresist comprises a non-aromatic polymer, a photoactive compound and a photoresist solvent.

51. The process of claim 49, where the antireflective coating is baked at temperatures greater than 90°C.